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APPLICATION NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO.
08/814,928	03/12/97	DALVI	V 42390.P4024

EXAMINER

LM02/0723

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ART UNIT	PAPER NUMBER
2752	10

DATE MAILED: 07/23/99

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

OFFICE ACTION SUMMARY

☒ Responsive to communication(s) filed on 7/6/99

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 D.C. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-30 is/are pending in the application.
Of the above, claim(s) 12-19 & 26-29 is/are withdrawn from consideration.
☐ Claim(s) _____ is/are allowed.
☒ Claim(s) 1-11, 20-25 & 30 is/are rejected.
☐ Claim(s) _____ is/are objected to.
☐ Claim(s) _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
☐ The specification is objected to by the Examiner.
☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.
☐ received in Application No. (Series Code/Serial Number) _____.
☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of Reference Cited, PTO-892
☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
☐ Interview Summary, PTO-413
☐ Notice of Draftperson's Patent Drawing Review, PTO-948
☐ Notice of Informal Patent Application, PTO-152

--SEE OFFICE ACTION ON THE FOLLOWING PAGES--

★ U.S. GPO: 1996-404-496/40517

This Office action is in response to the amendment filed July 6, 1999.

Applicant's arguments filed July 6, 1999 have been fully considered but they are not persuasive.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-11, 20-25 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicants' admitted prior art or, alternatively, Terada *et al.* (5,561,628). The particulars of the rejection can be found in the previous Office action. Applicants argue that while processor speeds may have increased, bus speeds have not increased as much. Applicants note that a "substantially larger number of reading operations can be performed in the time required to perform one erase operation than in the time required to perform one programming operation." While this is undeniably true, anyone can see that an 8 microsecond programming operation impacts access to the flash memory over a period equal to 800 bus cycles of a 100 MHZ bus, which is also a

substantially large number of reading operations. In fact, this represents approximately 100 flash memory reading operations, assuming no interleaving or other access accelerating techniques (also well known at the time), which techniques could beneficially be implemented to provide 800 reading cycles in that same 8 microseconds. Further, even though bus speeds have not increased as much as processor speeds, they none the less have increased, and presumably will increase even more in the future. Looking at the Intel family of processors, the 100 MHZ Pentium (circa Terada) operated on a 50 MHZ bus (at the time recently upgraded from a 33 MHZ bus). The Pentium family bus at the time of applicants' invention was 100 MHZ, as noted above. Thus, the numbers relating to bus speeds alone would suggest that the same technique to reduce the impact of an erase operation could certainly be used to reduce the impact of a programming operation. However, the rationale presented in the previous Office action is still meritorious. Should a 450 MHZ processor be put in a situation where data must be read from a flash memory before proceeding, if the flash memory has just begun a non-suspendable programming operation, absent some sort of multi-tasking or the like, the processor will be in a wait-state until the operation finishes, thus impacting 3600 processor cycles for an 8 microsecond wait. A 100 MHZ processor would only have lost 800 processor cycles, even though the elapsed time is identical. Further, during the obvious implementation of programming suspension, it would clearly have been obvious to maintain the provisions of erase suspension, thus the limitations of newly presented claim 30 would also have been obvious. Applicants have not presented any new solutions or techniques, but have merely applied an existing technique (i.e., the suspend operation) to

ameliorate the negative effects of an admittedly smaller impact (i.e., a programming operation which may affect 3600 processor cycles or 800 bus cycles). This modification boils down to a question of how much money is to be invested into the design and fabrication of a flash memory chip in providing the suspend circuitry, which must be balanced against the access availability of the flash memory during programming and erase operations. In a system that uses little or no flash memory, this may not be important. On the other hand, in a system with significant quantities of such memory, the programming operations may have significant detrimental impact. Thus it is clear that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art of flash memory chips and controllers.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any response to this final action should be mailed to:

Box AF
Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 308-9051, (for formal communications; please mark "EXPEDITED PROCEDURE")

Or:

(703) 305-9731 (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application should be directed to the technology center receptionist whose telephone number is **(703) 305-9600**.

Direct any inquiries concerning drawing review to the Drawing Review Branch (703) 305-8404.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Robertson whose telephone number is (703) 305-3825. The examiner can normally be reached Monday through Friday from 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Cabeca, can be reached at (703) 308-3116. The fax number for this technology center is (703) 305-9564. **The fax number for art unit 2752 is 305-9731.**

Communications which are not application specific may also be posted on e-mail at David.Robertson@USPTO.gov.

DAVID L. ROBERTSON
PRIMARY EXAMINER
ART UNIT 2752

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July 20, 1999